Sm 7/9

A Physician Talks About Smoking: A Slide Presentation

U.S. Department of Health and Human Services
Public Health Service
Office on Smoking and Health

HE 20.2:

Slides for this presentation may
be ordered by phone or mail from:
National Audiovisual Center, and
paid for by check, VISA, or MASTERCARD.
When ordering, refer to Title Document
No. A14700.

National Audiovisual Center
Customer Services Section
8700 Edgeworth Drive
Capitol Heights, MD 20743-3701
(301) 763-1896

A Physician Talks About Smoking

FOREWORD

"A Physician Talks About Smoking" has been developed for physicians and other health care professionals who are called upon to speak to medical and lay audiences on smoking and health. I commend my colleagues who respond to these requests; there is no topic more centrally important to the better health of our society, and no topic where public understanding is more important.

Information is presented here on the health effects of smoking, the etiology of smoking, and the prevalence and causes of smoking. Its sources are largely reports of the Public Health Service, but material from the Department of Agriculture and other public and private agencies is also included. The slides were originally developed by John Holbrook, M.D., then a medical officer with the Public Health Service and now Associate Professor of Internal Medicine at the University of Utah Medical School. With the help of Dr. Holbrook and other authorities, it has now been updated and expanded.

The commentary are suggestions only; I would urge speakers to present the material in their own way, deleting or reordering the sequence of slides and preparing their own visuals to supplement the presentation if this better meets the needs of their audience.

Those who wish additional data and information are invited to address their requests by mail or phone to the Office on Smoking and Health, Public Health Service, Rockville, MD 20857, (301) 443-1690.

C. Everett Koop, M.D.
Surgeon General
Public Health Service

Cigarette smoking is the chief avoidable cause of death in our society

Slide 1

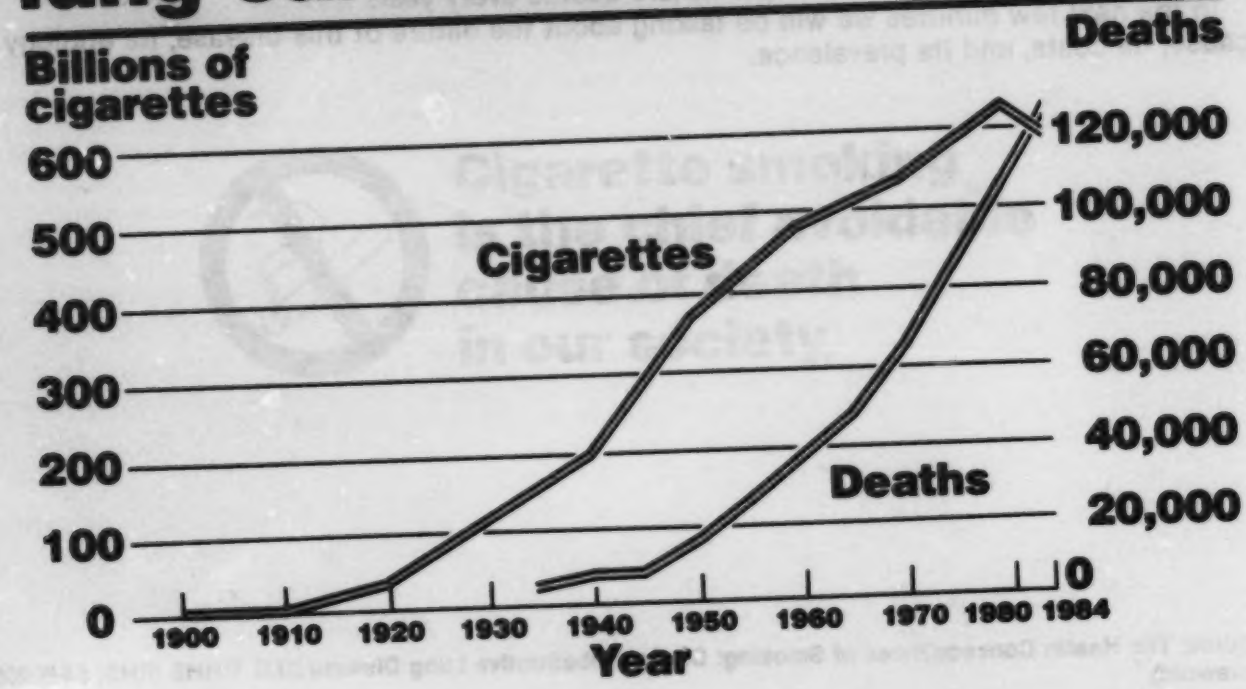
Cigarette smoking is the chief avoidable cause of death in our society

Cigarette smoking is the chief avoidable cause of death in our society. It is a "disease" which accounts for some 340,000 premature deaths every year.

In the next few minutes we will be talking about the nature of this disease, its etiology or cause, its costs, and its prevalence.

Source: **The Health Consequences of Smoking: Chronic Obstructive Lung Disease** (U.S. DHHS (PHS) 84-50205: Foreword).

Cigarette consumption and lung cancer deaths



Slide 2

Cigarette consumption and lung cancer deaths

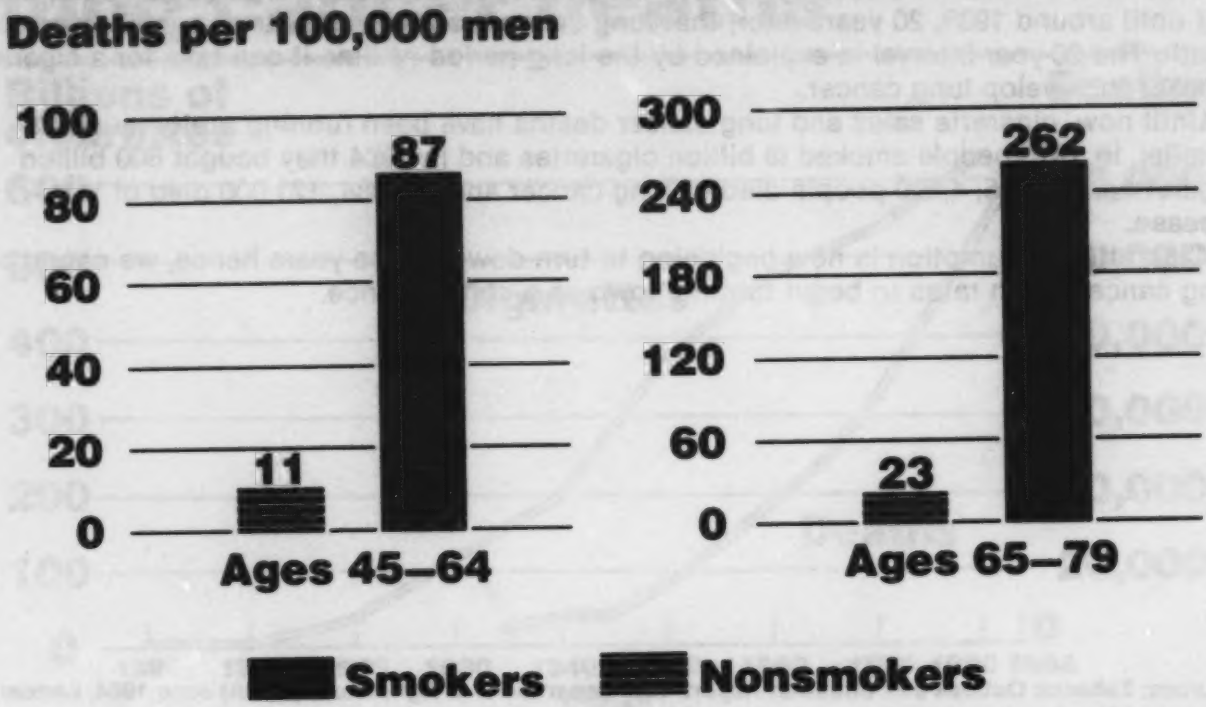
It was not until around 1915 that people began buying cigarettes in large numbers, and not until around 1935, 20 years later, that lung cancer began to appear as a major cause of death. The 20-year interval is explained by the long period of time it can take for a cigarette smoker to develop lung cancer.

Until now, cigarette sales and lung cancer deaths have been running pretty much in parallel. In 1915 people smoked 18 billion cigarettes and in 1984 they bought 600 billion cigarettes. In 1935, 4,300 people died of lung cancer and in 1984, 121,000 died of this disease.

Cigarette consumption is now beginning to turn down. Some years hence, we can expect lung cancer death rates to begin turning down as a consequence.

Sources: Tobacco Outlook and Situation Report. U.S. Department of Agriculture (USDA) June 1984. **Cancer Facts and Figures.** American Cancer Society, 1984.

Lung cancer deaths, smokers vs. nonsmokers



Slide 3

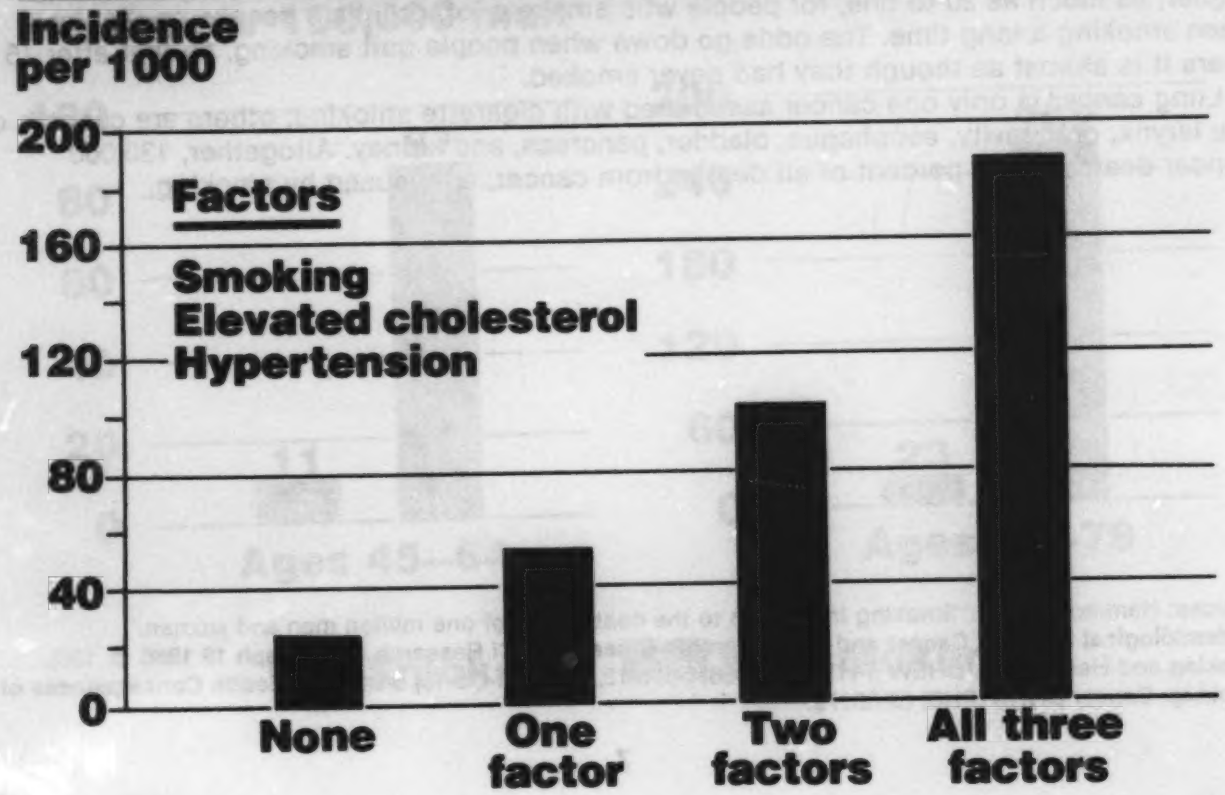
Lung cancer deaths smokers vs. nonsmokers

Smokers are ten times as likely to die of lung cancer as nonsmokers. The odds are even higher, as much as 20 to one, for people who smoke a lot, or inhale deeply, or who have been smoking a long time. The odds go down when people quit smoking, so that after 15 years it is almost as though they had never smoked.

Lung cancer is only one cancer associated with cigarette smoking; others are cancers of the larynx, oral cavity, esophagus, bladder, pancreas, and kidney. Altogether, 130,000 cancer deaths, or 30 percent of all deaths from cancer, are caused by smoking.

Sources: Hammond, E.C. "Smoking in relation to the death rates of one million men and women." **Epidemiological Study of Cancer and Other Chronic Diseases** (NCI Research Monograph 19 1966. p. 156). **Smoking and Health** (U.S. DHEW (PHS) 79-50066, pp. 5-12, 5-13, 5-14, 5-15, 5-24). **The Health Consequences of Smoking: Cancer** DHHS (PHS) 82-50179.

Risk factors for coronary heart disease



Slide 4

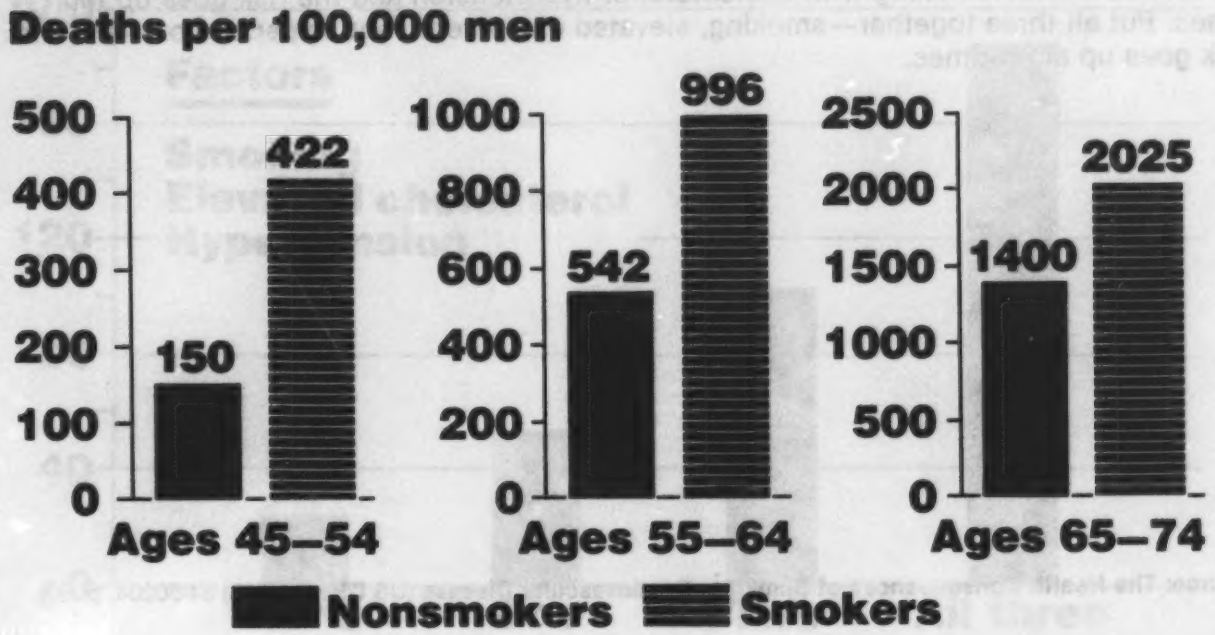
Risk factors for coronary heart disease

We have said that cigarette smoking causes 130,000 cancer deaths in the United States each year. It causes 170,000 deaths from coronary heart disease.

There are three major preventable risk factors for coronary heart disease, cigarette smoking, high blood pressure and elevated cholesterol. Smoking doubles one's chances of heart disease. Combine smoking with cholesterol or hypertension and the risk goes up four times. Put all three together—smoking, elevated cholesterol, and hypertension—and the risk goes up eight times.

Source: **The Health Consequences of Smoking: Cardiovascular Disease** (US DHHS (PHS) 84-50204, p. 99).

Coronary heart disease deaths, smokers vs. nonsmokers



Slide 5

Coronary heart disease deaths smokers vs. nonsmokers

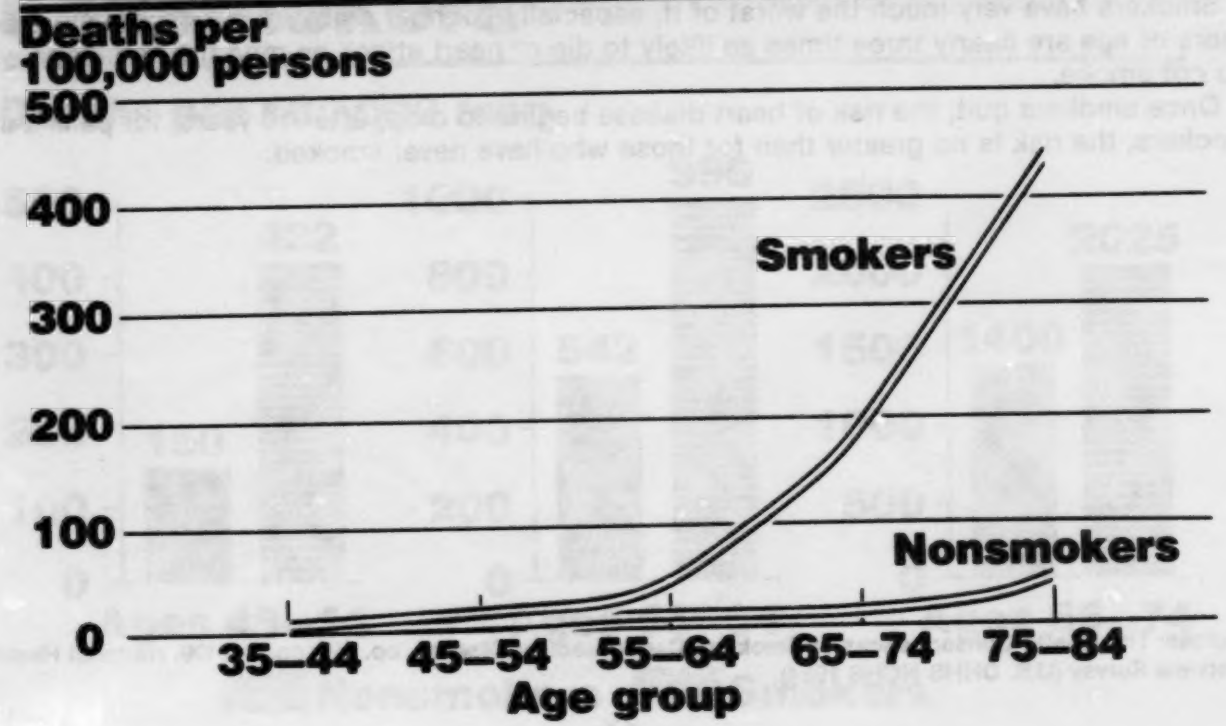
Earlier, we showed the risks of lung cancer for men who smoke and those who don't. Here is the same comparison, this time for coronary heart disease.

Smokers have very much the worst of it, especially younger smokers. Men from 45 to 54 years of age are nearly three times as likely to die of heart attack as men the same age who do not smoke.

Once smokers quit, the risk of heart disease begins to drop; after 10 years, for pack-a-day smokers, the risk is no greater than for those who have never smoked.

Sources: **The Health Consequences of Smoking: Cardiovascular Disease**. op. cit., pp. 7-8, 109. National Health Interview Survey (U.S. DHHS NCHS 1984).

COLD deaths smokers vs. nonsmokers



Slide 6

COLD deaths
smokers vs. nonsmokers

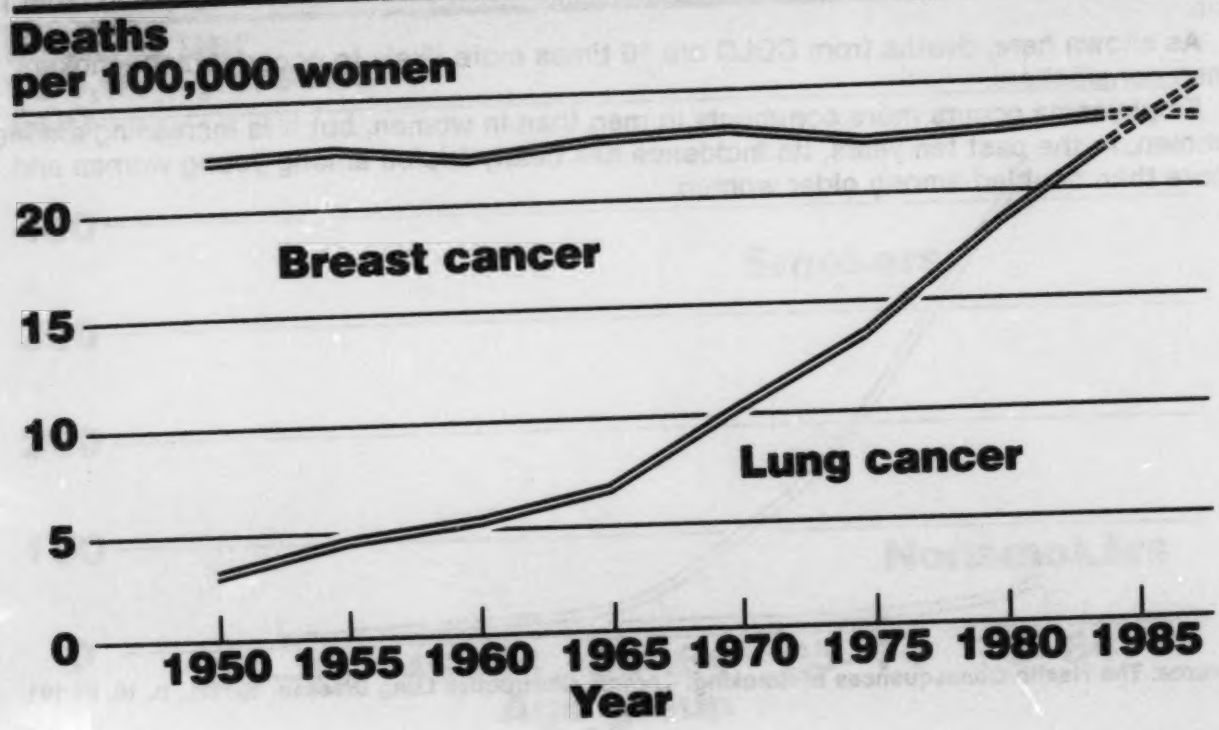
And now we look at deaths from COLD. COLD is chronic obstructive lung disease, which includes chronic bronchitis and emphysema. It primarily affects middle-aged and older people.

As shown here, deaths from COLD are 10 times more likely to occur among smokers than nonsmokers.

Emphysema occurs more commonly in men than in women, but it is increasing among women. In the past ten years, its incidence has nearly tripled among young women and more than doubled among older women.

Source: **The Health Consequences of Smoking: Chronic Obstructive Lung Disease**. op. cit., p. 10, 91-191.

Lung and breast cancer deaths



Slide 7

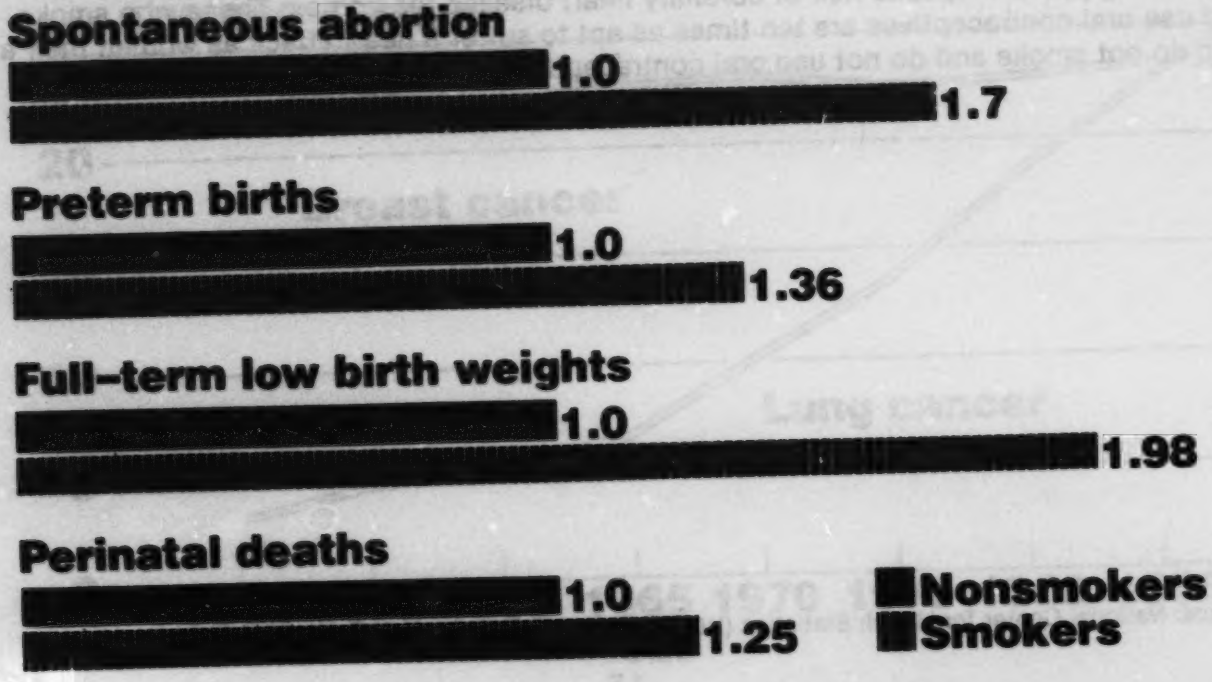
Lung and breast cancer deaths

Men began smoking intensively during World War I, and women during World War II; men's cancer death rates began to rise in the 1930s and women's in the 1960s. Lung cancer has now surpassed breast cancer as the chief cause of cancer death in women.

Smoking poses a special risk of coronary heart disease for women. Those who smoke and use oral contraceptives are ten times as apt to suffer a heart attack as women their age who do not smoke and do not use oral contraceptives.

Source: National Center for Health Statistics (NCHS), Scientific and Technical Information Branch. 1984.

Risks from smoking during pregnancy



Slide 8

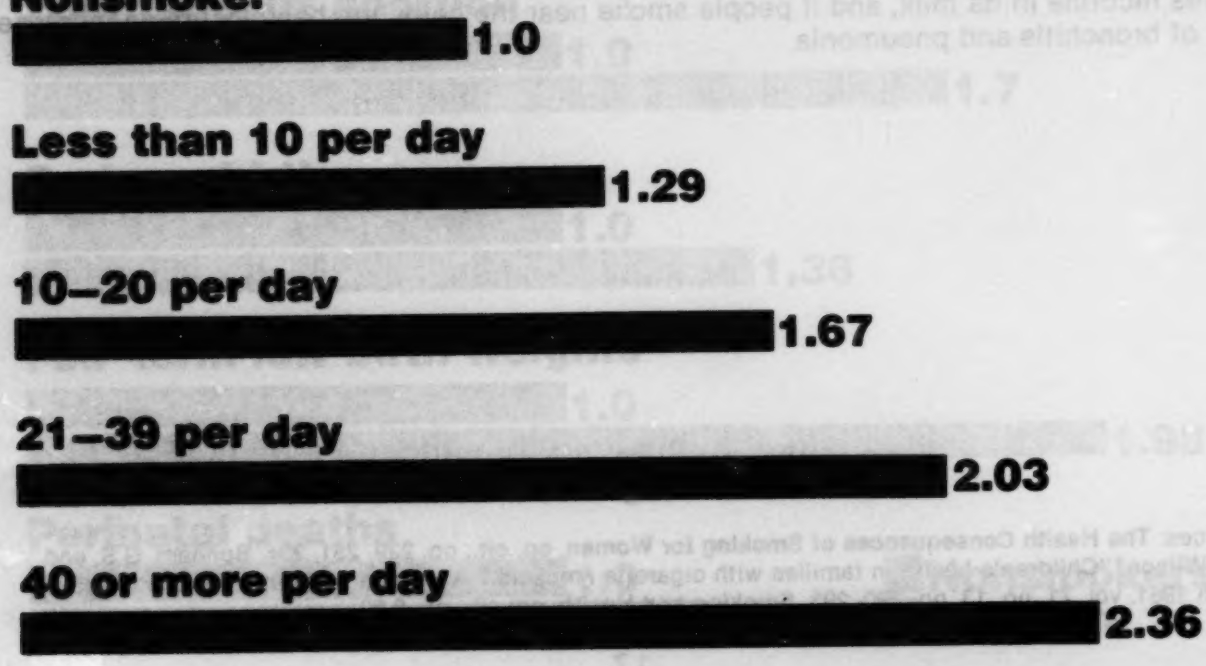
Risks from smoking during pregnancy

Smoking during pregnancy poses serious risks. Spontaneous abortion, preterm births, low-weight babies and fetal and infant deaths all occur more frequently when a pregnant woman smokes.

If mothers smoke after the baby is born, this is harmful, too. If the baby is nursed, it receives nicotine in its milk, and if people smoke near the baby, the baby incurs an increased risk of bronchitis and pneumonia.

Sources: **The Health Consequences of Smoking for Women.** op. cit., pp. 229, 231, 234. Bonham, G.S. and R.W. Wilson. "Children's health in families with cigarette smokers." **American Journal of Public Health.** March 1981. vol. 71, no. 13, pp. 290- 293. **Smoking and Health.** op. cit., pp. 8-50.

Mortality ratios by number of cigarettes smoked



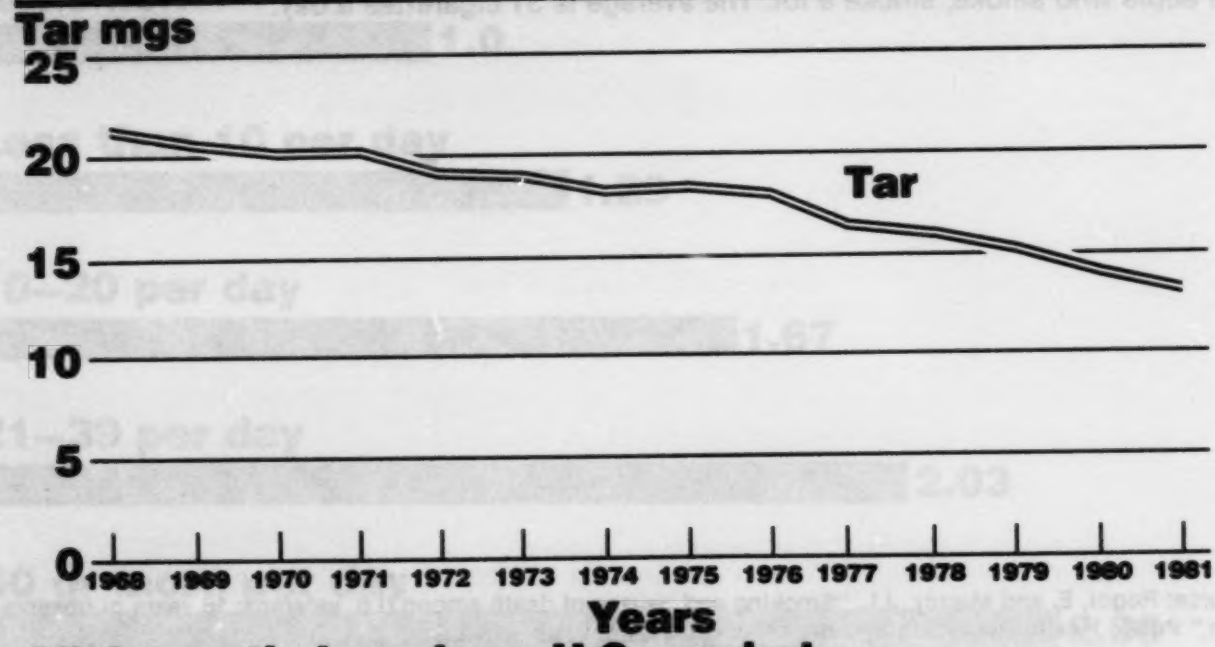
Slide 9 **Mortality ratios by number of cigarettes smoked**

Cigarette smoking is "dose-responsive"; the greater the exposure, the greater the risk. Exposure is determined by the number of cigarettes one smokes, how long one has smoked, how deeply the smoke is inhaled, and at what age one began to smoke.

People who smoke, smoke a lot. The average is 31 cigarettes a day.

Source: Rogot, E. and Murray, J.L. "Smoking and causes of death among U.S. veterans: 16 years of observation." Public Health Reports. May-June 1980. vol. 95, no. 3, pp. 213-222.

Weighted average of tar per cigarette consumed in the U.S.



All domestic brands on U.S. market

Slide 10

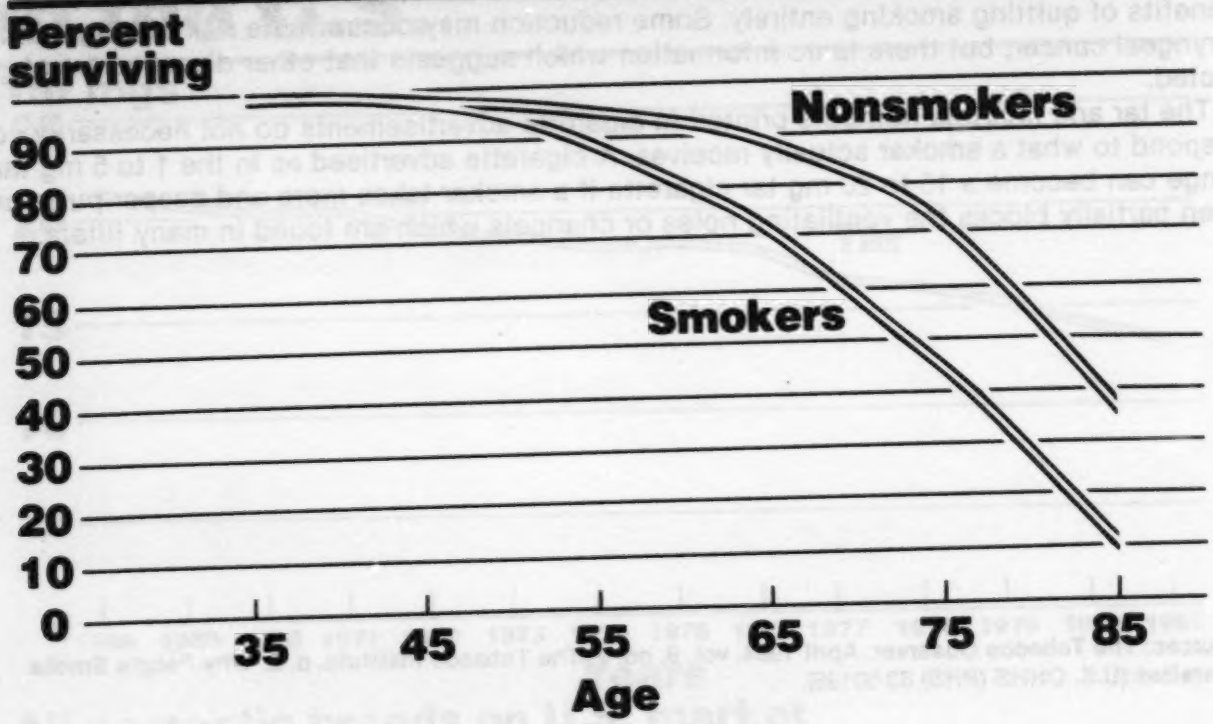
Weighted average of tar per cigarette consumed in the U.S.

Many smokers switch to low tar and nicotine cigarettes in the hope of reducing the risks of smoking. To some extent they may benefit, but the benefits are tiny compared to the benefits of quitting smoking entirely. Some reduction may occur in the risk of lung and laryngeal cancer, but there is no information which suggests that other diseases are affected.

The tar and nicotine numbers printed in cigarette advertisements do not necessarily correspond to what a smoker actually receives. A cigarette advertised as in the 1 to 5 mg tar range can become a 15 to 20 mg tar cigarette if a smoker takes more and deeper puffs or even partially blocks the ventilating holes or channels which are found in many filters.

Sources: **The Tobacco Observer**. April 1984. vol. 9, no. 2, The Tobacco Institute. p. 2. **Why People Smoke Cigarettes** (U.S. DHHS (PHS) 83-50195).

Life tables, 35-year-old men smokers vs. nonsmokers



Slide 11

Life tables, 35-year-old men smokers vs. nonsmokers

The clearest way to appreciate the health consequences of smoking is by comparing the death rates of people who smoke with the death rates of people who don't. At every age, proportionately more smokers die than nonsmokers.

The difference is greatest for men under the age of 65, where the smoker's risk of dying is twice that of the nonsmoker's. These differing death rates have a cumulative effect over the years.

Here we see the survival rates of male smokers and nonsmokers beginning at age 35. As will be seen, by the time the two groups of men reach age 55, 10 percent of the smokers are dead, but only 4 percent of the nonsmokers. By age 65, it is 28 percent of smokers, but 10 percent of the nonsmokers who are dead; by age 75, 50 percent of the cigarette smokers, but only 25 percent of the nonsmokers.

These figures come from the State Mutual Life Assurance Company, which was the first large life insurance company to offer reduced rates to people who don't smoke. Now, most companies have such policies.

Source: Cowell, M.J. and B.L. Hirst. "Mortality differences between smokers and nonsmokers." **Transactions of the Society of Actuaries** (32) 1980. pp. 185-261.

Costs of smoking-related disease and death, 1984

- **Direct medical costs** — **$23.3 billion**
- **Indirect costs from illness** — **$ 9.3 billion**
- **Indirect costs from mortality** — **$21.1 billion**

- **Money saved to society when <u>one</u> heavy smoker quits**

Age group	Money saved
35 – 39	$40,829
45 – 49	24,690
55 – 59	9,093

Slide 12 **Costs of smoking-related disease and death, 1984**

Cigarettes contribute to the economy, but the economic burdens caused by cigarettes are much greater than whatever economic contributions they may make.

The first set of figures shows how much it costs to give medical and health care to people who have become ill because of smoking, and second, how much is lost to the economy from the illness and premature deaths caused by cigarette smoking.

The second set of figures are estimates of how much it is worth to society to help one heavy smoker quit. The numbers take into account the possibility of future illness and premature death. The younger a person is, and the more years of productive life which lie ahead, the greater are the potential savings.

Sources: Rice, D.P., T.A. Hodgson, P. Sinsheimer, W. Browner. "The economic costs of smoking in the United States." (unpublished). Oster, G. et al. **The Economic Costs of Smoking and Benefits of Quitting** (Lexington, MA, DC Heath and Co. 1984. p. 122).

How cigarettes cause disease

Slide 13

How cigarettes cause disease

We have said that cigarette smoking is a "disease" and that it contributes to the premature death of 340,000 Americans every year. This is one death out of every six deaths occuring in the United States each year. For the sake of comparison, motor vehicle accidents account for approximately 50,000 deaths each year.

We will be looking now at the cause, or etiology, of this "disease".

Some of the substances in tobacco smoke

- Benz(a)anthracene
- Benzo(b)fluoranthene
- Benzo(a)pyrene
- Cadmium and certain cadmium compounds
- Dibenz(a,h)acridine
- Dibenz(a,h)anthracene
- 7H-Dibenzo(c,g)carbazole
- Dibenz(a,j)acridine
- Dibenzo(a,h)pyrene
- Dibenzo(a,i)pyrene
- Indeno(1,2,3-cd)pyrene
- 2-Naphthylamine
- N-Nitrosodiethylamine
- N-Nitrosonornicotine
- N-Nitrosopiperidine
- N-Nitrosopyrrolidine
- 2,3,7,8-Tetrachloro-dibenzo-p-dioxin

Slide 14

Some of the substances in tobacco smoke

Cigarette smoke is a mixture of some 4,000 different chemical substances. Here are some of these substances which the United States Toxicology Program identifies as "either known to be carcinogens or which may be reasonably anticipated to be carcinogens".

Source: **Third Annual Report on Carcinogens**. National Toxicology Program, Sept. 1983 (DHHS PHS NTP 82-330).

Ciliotoxins and irritants in gas phase of tobacco smoke

Hydrocyanic acid

Acrolein

Ammonia

Formaldehyde

Acetaldehyde

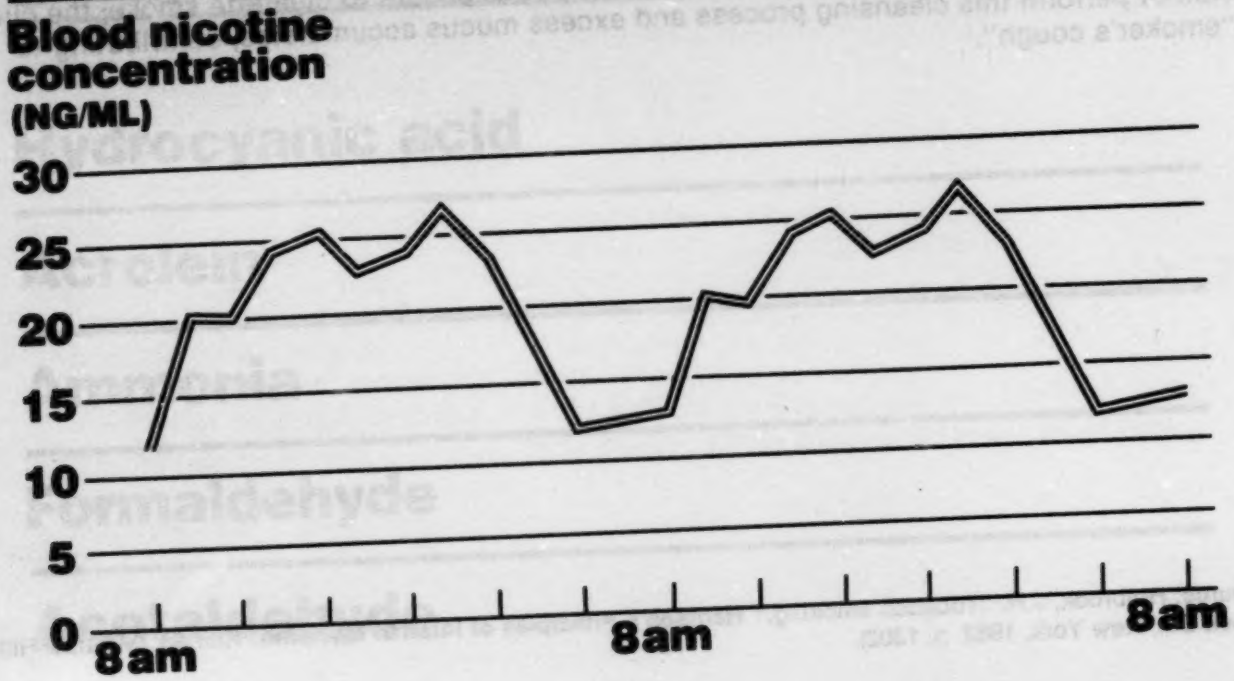
Slide 15

Ciliotoxins and irritants in gas phase of tobacco smoke

Here is a list of ciliotoxins and irritants found in tobacco smoke which can produce eye, nose, and throat irritation. Cilia are tiny hair-like projections which help to sweep dirt and waste products out of the lungs. When impaired by exposure to cigarette smoke, the cilia cannot perform this cleansing process and excess mucus accumulates, contributing to "smoker's cough".

Source: Holbrook, J.H. "Tobacco smoking." **Harrison's Principles of Internal Medicine.** 10th ed. (McGraw-Hill Book Co., New York, 1982. p. 1302).

A smoker's levels of nicotine over 48 hours



Slide 16 **A smoker's levels of nicotine over 48 hours**

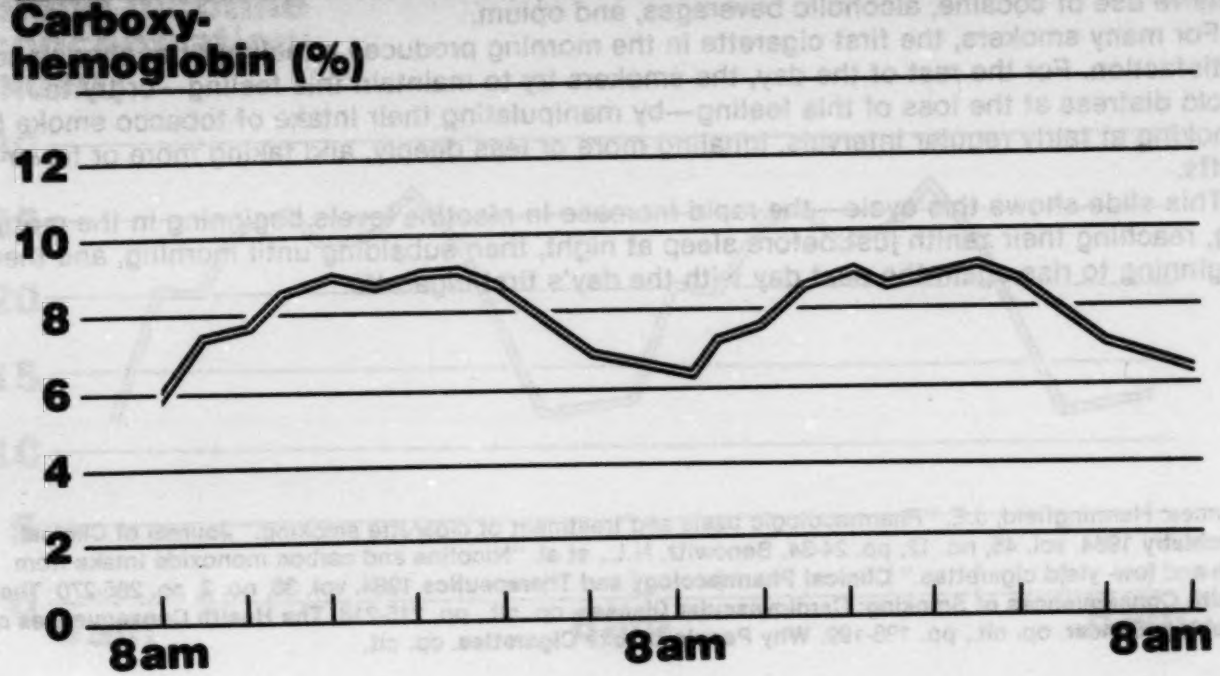
Nicotine is a critical substance in cigarette smoke. It is implicated in the onset of heart attacks and cancer, but its most important role is reinforcing and strengthening the desire to smoke. It acts in much the same way as cocaine, ethanol, and morphine act in the compulsive use of cocaine, alcoholic beverages, and opium.

For many smokers, the first cigarette in the morning produces a feeling of euphoria and satisfaction. For the rest of the day, the smokers try to maintain this feeling—or try to avoid distress at the loss of this feeling—by manipulating their intake of tobacco smoke by smoking at fairly regular intervals, inhaling more or less deeply, and taking more or fewer puffs.

This slide shows this cycle—the rapid increase in nicotine levels beginning in the morning, reaching their zenith just before sleep at night, then subsiding until morning, and then beginning to rise again the next day with the day's first cigarette.

Sources: Henningfield, J.E. "Pharmacologic basis and treatment of cigarette smoking." **Journal of Clinical Psychiatry** 1984. vol. 45, no. 12, pp. 24-34. Benowitz, N.L., et al. "Nicotine and carbon monoxide intake from high-and low- yield cigarettes." **Clinical Pharmacology and Therapeutics** 1984. vol. 36, no. 2, pp. 265-270. **The Health Consequences of Smoking: Cardiovascular Disease.** op. cit., pp. 215-218. **The Health Consequences of Smoking: Cancer.** op. cit., pp. 198-199. **Why People Smoke Cigarettes.** op. cit.

A smoker's levels of carbon monoxide over 48 hours

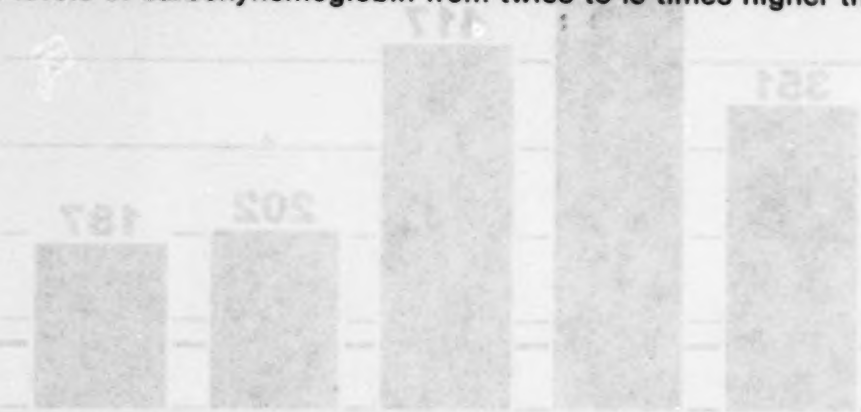


Slide 17 **A smoker's levels of carbon monoxide over 48 hours**

The body's uptake of carbon monoxide follows a pattern very similar to that of nicotine, rising quickly in the morning, continuing to rise during the day, and subsiding at night.

Carbon monoxide makes up nearly four percent of cigarette smoke. When it is inhaled, it combines with hemoglobin in the blood to form carboxyhemoglobin, which interferes with the body's ability to obtain and utilize oxygen. Carbon monoxide is implicated in many of the disease processes associated with cigarette smoking, including harmful effects on the development of the fetus. Like nicotine, carbon monoxide is poisonous in heavy concentrations.

Smokers have levels of carboxyhemoglobin from twice to 15 times higher than nonsmokers.



Sources: Benowitz, et al., op. cit. **Smoking and Health**. op. cit., pp. 14-37.

A nonsmoker's exposure to cigarette smoke

Slide 18 **A nonsmoker's exposure to cigarette smoke**

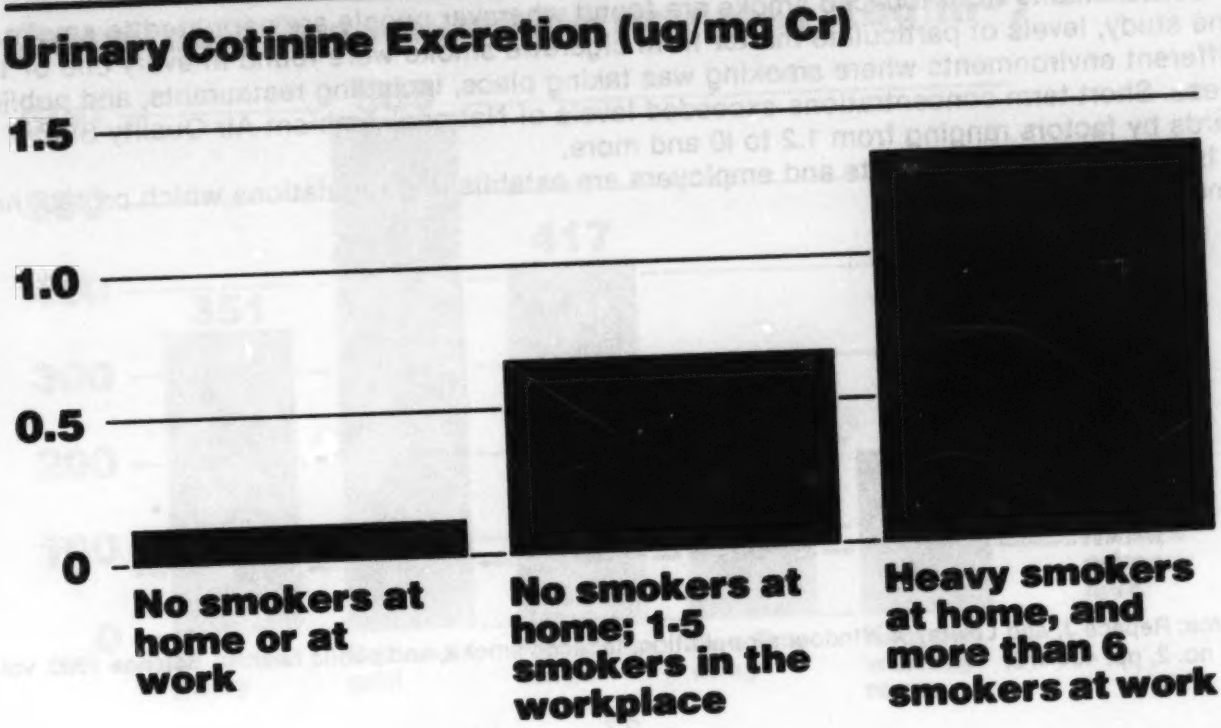
Cigarette smokers are not the only ones exposed to cigarette smoke. Nonsmokers suffer from cigarette smoke, too.

Contaminants from tobacco smoke are found wherever people are permitted to smoke. In one study, levels of particulate matter from cigarette smoke were found in every one of 19 different environments where smoking was taking place, including restaurants, and public areas. Short-term concentrations exceeded levels of National Ambient Air Quality Standards by factors ranging from 1.2 to 10 and more.

Increasingly, Governments and employers are establishing regulations which protect nonsmokers.

Source: Repace J. and Lowrey A. "Indoor air pollution, tobacco smoke, and public health." **Science** 1980. vol. 208, no. 2, pp. 464-472.

A nonsmoker's absorption of nicotine


Urinary Cotinine Excretion (ug/mg Cr)
1.5
1.0
0.5
0
No smokers at home or at work
No smokers at home; 1-5 smokers in the workplace
Heavy smokers at home, and more than 6 smokers at work

Slide 19

A nonsmoker's absorption of nicotine

Persons exposed to other people's tobacco smoke absorb nicotine, carbon monoxide and other constituents of the smoke just as smokers do, although in smaller amounts. How much they absorb depends on the extent and length of exposure and the quality of ventilation.

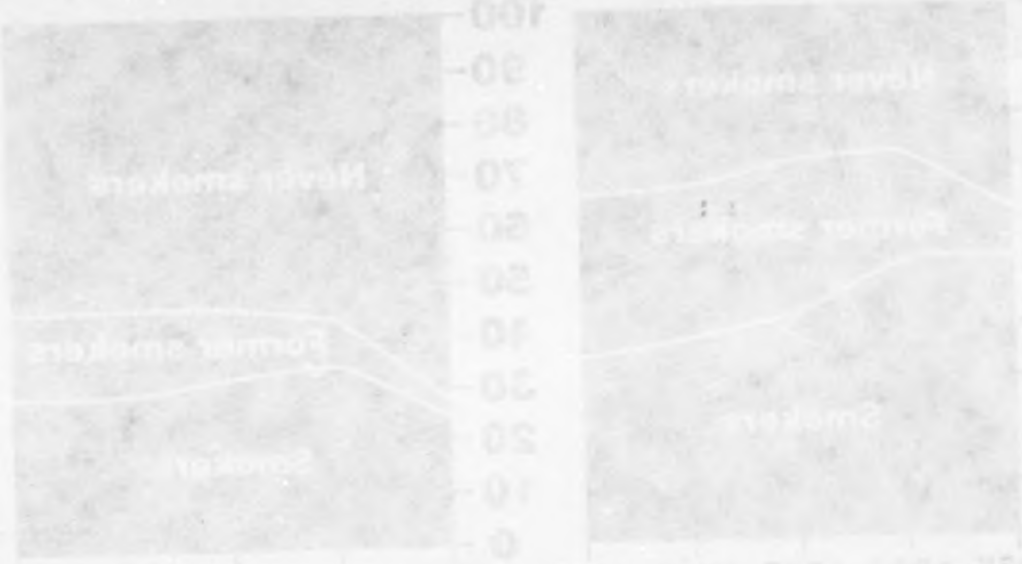
Cotinine is the major metabolite of nicotine in the blood and urine. It can be found in nonsmokers who live or work with people who smoke. The amounts reported here, at the higher limits, correspond to the equivalent of one or two cigarettes a day.

Source: Matsukura, S. et al. "Effects of environmental tobacco smoke on urinary cotinine excretion in nonsmokers: evidence for passive smoking." **New England Journal of Medicine** 1984. vol. 311, no. 13, pp. 828-32.

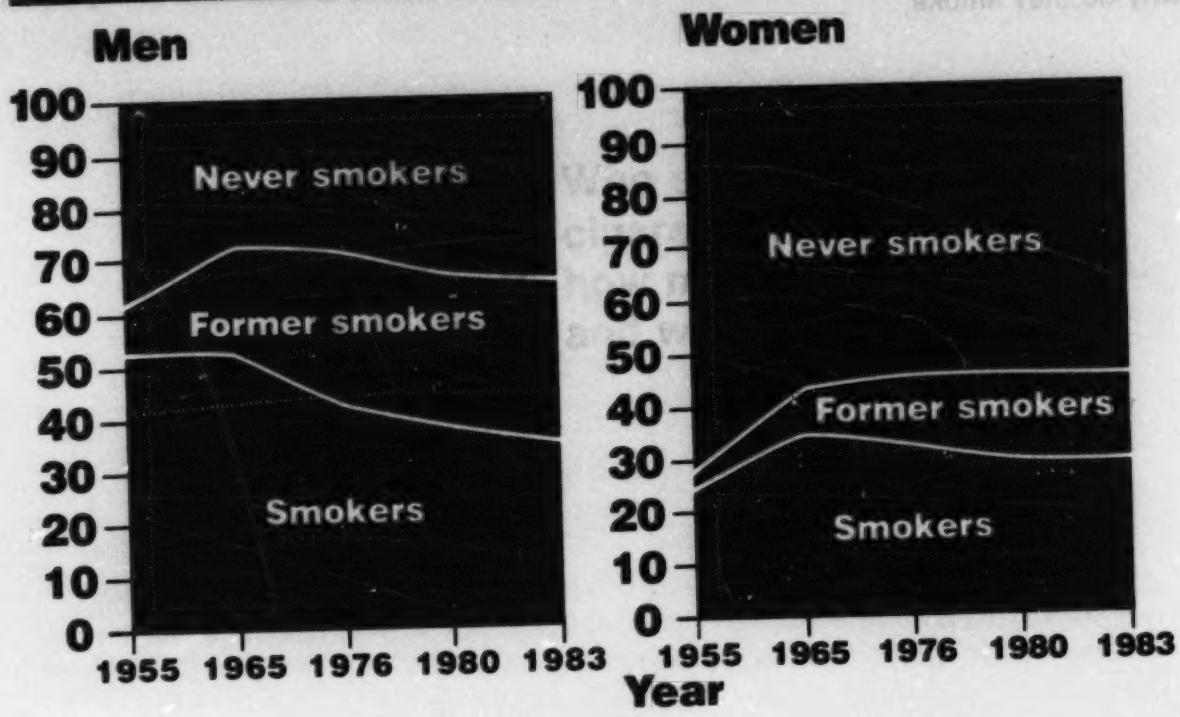
Who smokes cigarettes, how much, and why?

Slide 20 **Who smokes cigarettes, how much, and why**

We have described cigarette smoking as a disease. We talk now about the prevalence of this disease. The questions we ask are: who smokes cigarettes, how much do they smoke, and why do they smoke.



Percentage of smokers and nonsmokers, 1955–1983

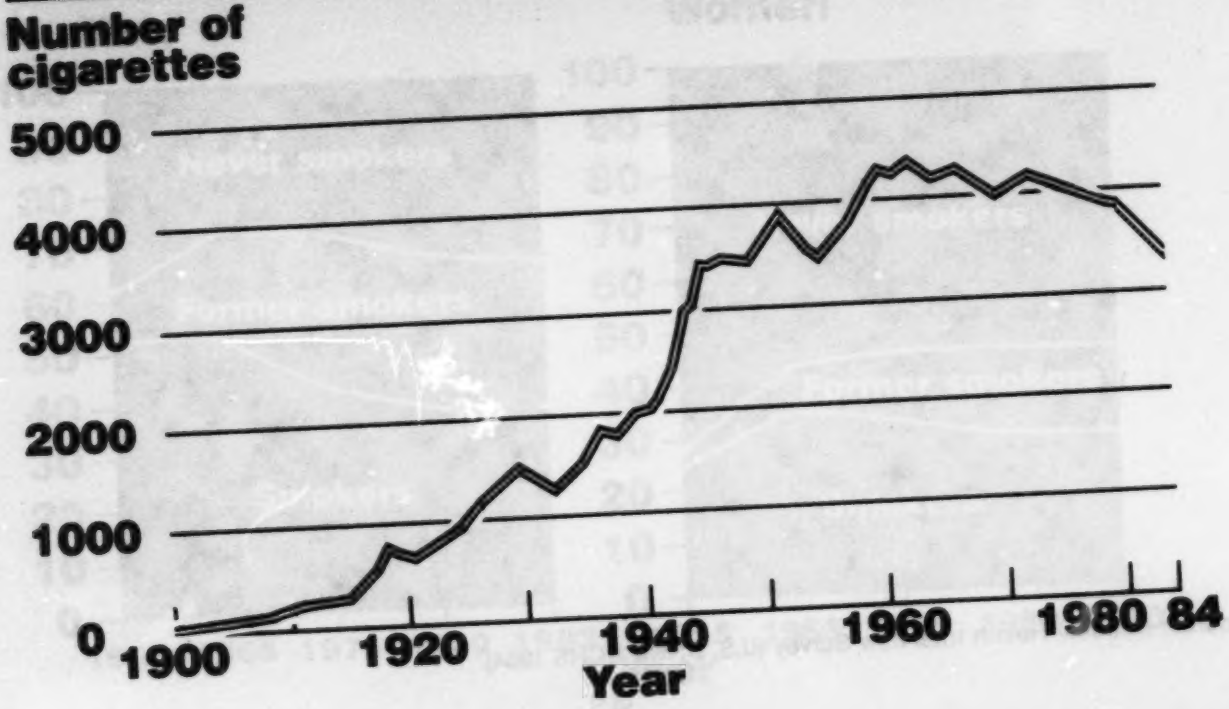


Slide 21 **Percentage of smokers and nonsmokers, 1955-1983**

We have made substantial progress in reducing smoking in the past 20 years. The percentage of male smokers has dropped from one-half to one-third and the percentage of women smokers is now below 30 percent.

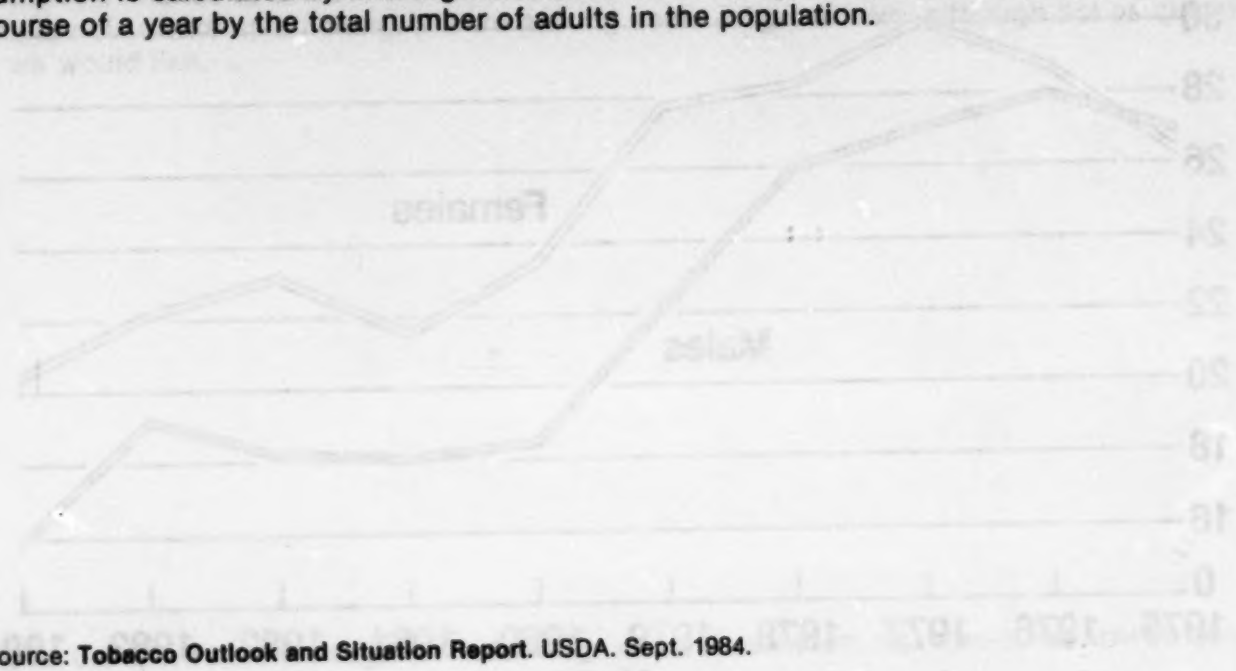
Source: National Health Interview Survey (U.S. DHHS NCHS 1984).

Per capita cigarette consumption, 18 and older



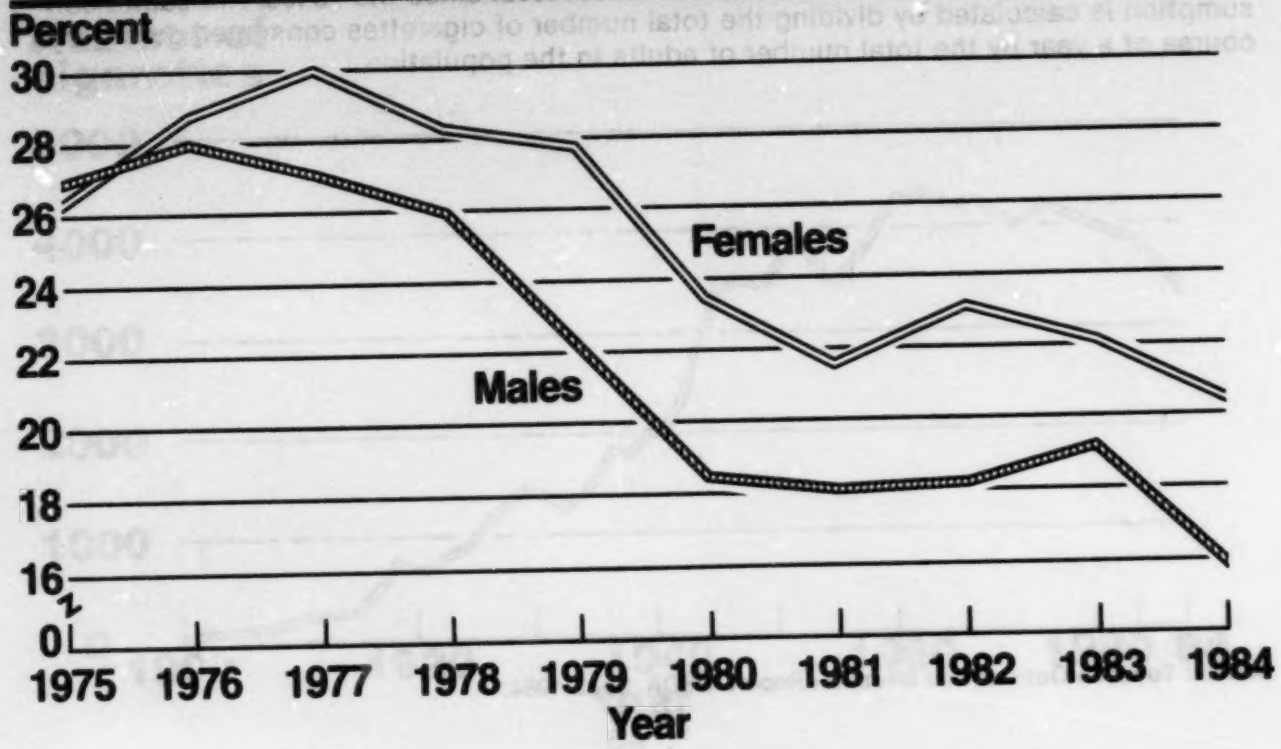
Slide 22 **Per capita cigarette consumption, 18 years and older**

Per capita cigarette consumption reached its highest point in 1963 and has been declining ever since. It is now below 3,500, the lowest level since the 1940s. Per capita consumption is calculated by dividing the total number of cigarettes consumed during the course of a year by the total number of adults in the population.



Source: **Tobacco Outlook and Situation Report**. USDA. Sept. 1984.

Daily cigarette smoking by high school seniors



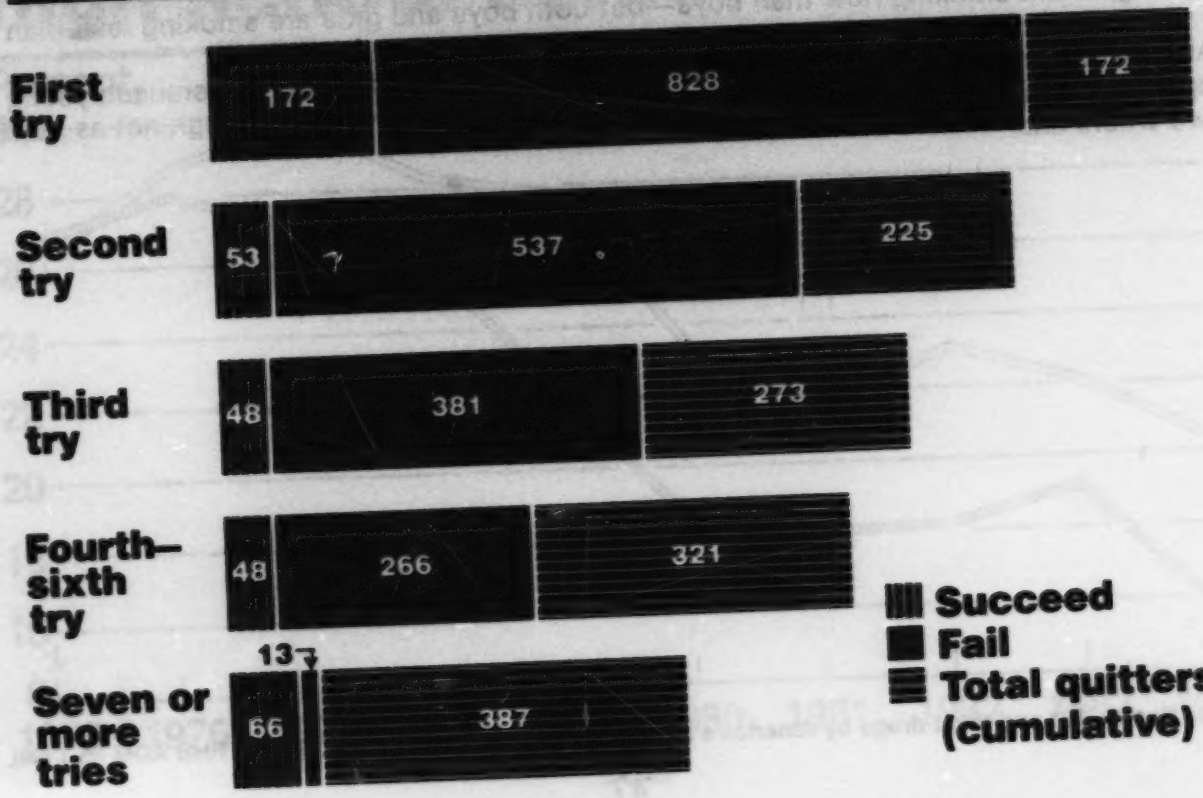
Slide 23 **Daily cigarette smoking by high school seniors**

More girls are smoking now than boys—but both boys and girls are smoking less than ten years ago.

Any real chance to achieve a smokeless society rests on our ability to persuade young people not to take up smoking. We are making some progress here, although not as quickly as we would like.

Source: Use of licit and illicit drugs by America's high school students 1975-1984. (DHHS PHS ADM 85-1394).

1,000 people try to quit



Slide 24

1,000 people try to quit

We come now to the question of why, in the face of overwhelming evidence of risk, people are still smoking cigarettes.

There are at least three reasons: the addictive nature of smoking, the constant pressure of advertising and promotion, and our social acceptance of smoking.

Cigarette smoking can be addictive. The slide here shows this, in the smoking histories of 1,000 typical smokers, based on 6,000 interviews in a national survey in 1975.

At the top of the chart, 1,000 people are shown who are trying to quit for the first time. Of these, 172 succeed, and 828 fail. Some of the losers give up; the others go back and try again. On the second try, 53 succeed and 537 fail. This process continues until after seven or more tries, 387 people remain who are no longer smoking.

It is possible to quit, and more than 37 million people have done it, but it can be difficult and it can take many, many tries.

Sources: **Why People Smoke Cigarettes**. op. cit. **Adult Use of Tobacco** (U.S. DHEW 1975. pp. 67-78).

Cigarette advertising in 1983

	(millions of dollars)
Newspapers	$201
Magazines	388
Outdoor	295
Transit	27
Sampling	126
Public entertainment	77
Other expenditures	787
TOTAL	$1,901

Slide 25 **Leading advertisers in 1983**

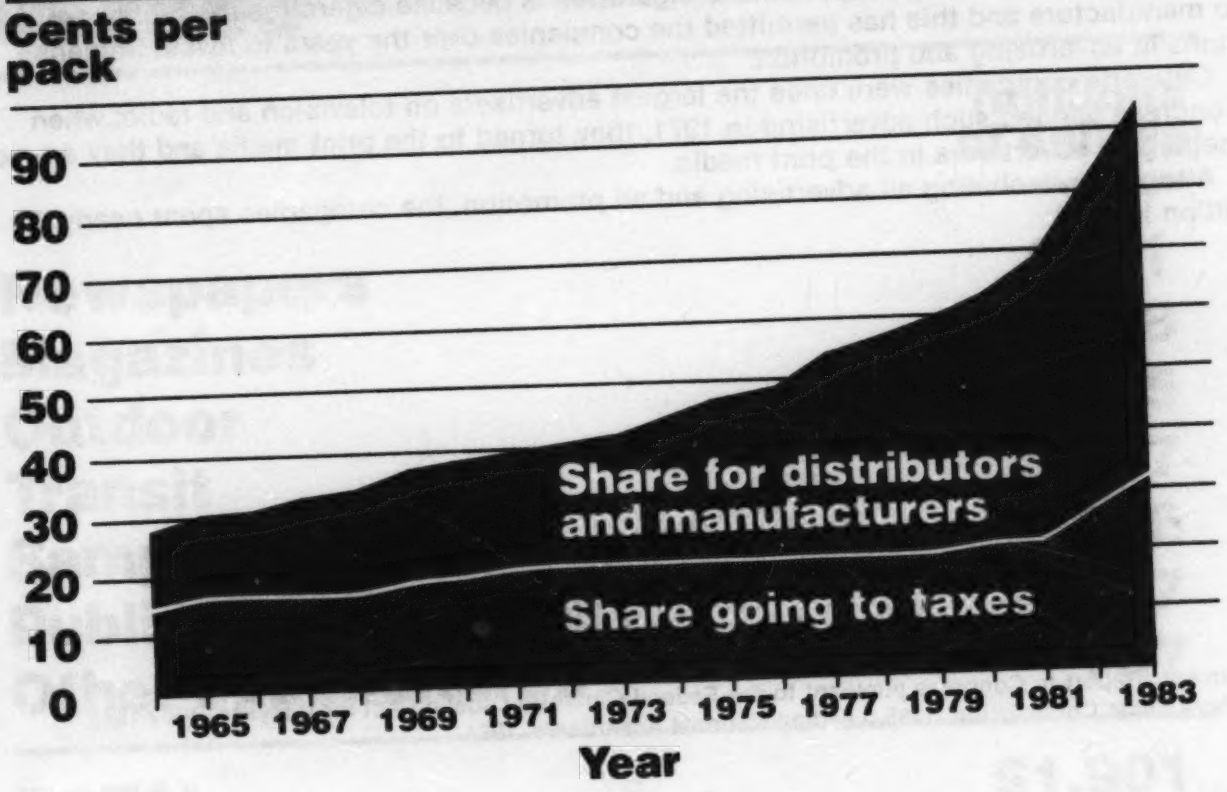
A second reason why people smoke cigarettes is because cigarettes are highly profitable to manufacture and this has permitted the companies over the years to invest immense sums in advertising and promotion.

Cigarette companies were once the largest advertisers on television and radio; when Congress banned such advertising in 1971, they turned to the print media and they are now the largest advertisers in the print media.

Altogether, including all advertising and all promotion, the companies spent nearly $2 billion in 1983.

Sources: "Report to Congress pursuant to the Federal Cigarette Labeling Act for the years 1982-1983." Federal Trade Commission, 1985. **Leading National Advertisers**. 1984.

Cigarettes are costing more



Slide 26

Cigarettes are costing more

Cigarettes are costing more and this is helping reduce cigarette smoking. In the years from 1980 to 1983, the average price of a pack of cigarettes rose from 63 cents to 95 cents. Eleven cents of this were increased taxes and 21 cents were increased costs and profits.

Source: **The Tax Burden on Tobacco**. The Tobacco Institute 1983.

Out of 1,000 kids who smoke, 750 come from families where one or both parents smoke.

Slide 27

Out of 1,000 kids who smoke, 750 come from families where one or both parents smoke

The most important reason why people smoke cigarettes is our acceptance of smoking. Our children grow up in a world where cigarettes are sold everywhere, where cigarettes are smoked by respected and admired people and where, at least until very recently, there were almost no restrictions against smoking in homes and stores, in public places, on school property, even in doctor's offices and hospitals.

Dr. C. Everett Koop, the Surgeon General, has pointed out that rebellion is blamed for a lot of teenage problems, but smoking is not usually associated with rebellion. As shown here, the great majority of young people who smoke are simply following their parents' example.

Source: Green, D.E. **Teenage Smoking: Immediate and Long Term Patterns** (U.S. DHEW, The National Institute of Education 1979, p. 35).

Cigarette smoking is the chief avoidable cause of death in our society